

PHARMACY REMAINS DISCOVERED IN TOWN OF SHAMKIR

ŞEMKİR ŞEHİR YERİNDE BULUNAN ECZANE KALINTISI

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ABSTRACT

The archeological complex, consisting of multiple rooms, discovered in 2014 in the area of Medieval Shamkir town, which is located in the Western region of the Azerbaijan Republic, was one of the important structures of the town. A room located, in the south part of complex with internal area of 47 m², is assumed to be remains of pharmacy. Remains of a structure, possessing 6 hearths, laid with baked bricks, were discovered on its Eastern side. During archaeological studies of the complex, equipment typical for a pharmacy such, as various pottery, glassware samples, stone tools, as well as plant remains, was uncovered. One may state, that one of alembics, applied in pharmacy for distillation process, was preserved almost intact. Sphero- conical vessels, albarello type vessels, earthenware vessels with a small hole in the neck for air intake, a sample of glazed earthenware pot with partition wall, divided into two parts, represent equipment, which is typical for pharmacy. Findings include numerous fragments of glass flasks and medicinal vessels, used at preparation and packaging of medicines. Remains of charred plant remains, discovered during research of the complex had healing properties and were used, as raw material at preparation of medicines in the Middle Ages.

Archaeological evidence of revealed archaeological complex give ground to state, that these are remains of a pharmacy, which functioned during the Seljuk period.

Keywords: Shamkir, Muslim medicine, pharmacy, pharmacy equipment, alembic, medicinal plants.

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ÖZET

2014 yılında, Azerbaycan Cumhuriyeti'nin batısındaki Orta Çağ Şemkir şehir yerinde keşfedilen arkeolojik kompleks, şehrin önemli yapılarından birinin kalıntılarıydı. Kompleksin güneyindeki 47 m²'lik bir odanın eczane kalıntıları olması muhtemeldir. Doğu tarafında 6 fırınlı tuğla bir yapının kalıntıları ortaya çıkarılmıştır. Kompleksin arkeolojik keşfi, eczane için tipik olan çeşitli çömlekler, cam eşyalar, taş aletler gibi ekipmanları ve bitkisel kalıntılar ortaya çıkardı. Eczanede damıtma işlemi için kullanılan anbiglerden biri neredeyse tamamen bozulmamıştı. Küre- konikler, albarelo tipi kaplar, boğazda havalandırma için küçük delikli çanak çömlek kapları ve bir bölme duvarla ikiye ayrılan sırlı çanak çömlek numunesi de eczane için tipik bir donanımdır. Buluntular arasında ilaçların hazırlanması ve paketlenmesi için kullanılan çok sayıda cam şişe ve ilaç kapları bulunmaktadır. Kompleksin keşfi sırasında bulunan karbonatlı bitki fosilleri, iyileştirici özelliklere sahipti ve ortaçağ tıbbında hammadde olarak kullanıldı.

Arkeolojik kanıtlar, keşfedilen arkeolojik kompleksin Selçuklu döneminde faaliyet gösteren eczanenin bir kalıntısı olduğunu gösteriyor.

Anahtar Kelimeler: Şemkir, Müslüman tıp, eczane, eczane ekipmanları, anbig, şifalı bitkiler.

INTRODUCTION

Shamkir is one of Azerbaijan ancient cities. Located in route of the Great Silk Road, Shamkir played an important role in the military, political, social, economic and cultural life of the Azerbaijan in the Middle Ages. Flourishing period of the town was in the 11th-12th centuries, and it was destroyed, as a result of the Mongol invasion. Many Azerbaijani cities were destroyed during the Mongol invasion during 30th of the 13th century. Shamkir shared the same fate.

Ruins of medieval Shamkir town are currently located in the western region of the Azerbaijan Republic, in the north of the Gadingala village, on banks of the Shamkir River, with 40°50'70,10''- N, 46°07'24,10''- E coordinates, at height 316,3m above sea level.

Large-scale archaeological excavations were conducted in 9 areas of the town, mainly, in Naringala (citadel) and Shehristan parts, occupying total area, more than 1ha.

For the first time in the archeology of Azerbaijan, archeological excavations covered 60% of Naringala territory, one of settlements of medieval period in the Shamkir area, and allowed to study, as a whole, street network, defense installations, state and public buildings, household and farm structures, engineering facilities.

PHARMACY REMAINS

A complex, consisting of multiple rooms with length of 16.6m and width of 11m, forming an area of 182,6m² discovered in the central part of Naringala, which is in Shamkir town area, was one of the prominent structures of the town. This complex, which had a basement from large and medium-size river stones, had been composed with walls, made of clayed blocks and baked bricks and was severely damaged, as a result of the Mongol occupation and also earth-works of the Russian military men in the 19th century led to powerful destruction in certain places up to basement. However, remains provide evidence of existence of more than four rooms in the complex. Narrow streets stretched towards North and South from East and West the complex. It is supposed that there are remains of pharmacy with internal area of 47m² in the South of the complex (Fig. 1-2). It is necessary to note, that due to meager material evidence of ancient and medieval pharmacy in Azerbaijan archeology, pharmacy and its equipment haven't been subject of special research hitherto. From this view point, study of pharmacy remains, discovered in the town of Shamkir, is of great importance for Azerbaijan science. Heavy destruction of pharmacy does not allow us establishing

comprehensive picture of all its structural elements. Nevertheless, revealed remains serve, as a basis for putting forward certain assumptions about pharmacy, which functioned during the Seljuk period. One of points, drawing attention is facing works on upright laying with baked bricks of lower part of masonry in remains of relatively well-preserved clayed or raw brick wall and the upper part is covered with plaster and it is dyed with in red color. The floor of a complex was laid with baked bricks. The Western wall of the room on the



Fig. 1: View of the remains of Pharmacy / *Eczane kalıntılarının Görünümü* (2014).



Fig. 2: General view of the north-west sector of Shamkir citadel / *Şemkir içkalesinin Kuzeybatı kesiminin Genel Görünümü* (2018)

Southern side is preserved intact at distance of 2.8 m. Basis of the wall was made of clay and facing, laid with baked bricks from inside, is partially preserved. Facing is laid by bricks of vertical masonry with dimensions of 23x23x6cm, 21x21x5cm. Remains of the Southern wall of the room were also severely destroyed and only 2.3m long was studied. Its distinguishing feature is absence of brick lining, laying of plaster on clayed wall and dying with red paint. Animal and bird images were drawn on dye using engraving technique. Remains of quadrangular structure with dimensions of 2 x 2.15m were discovered in the North-West corner of this room. 2 and 4 rows of masonry preserved on its southern wall and 3 rows survived on the Eastern wall. At distance of 2.85m to the

East from the wall of that structure, remains of erection, made of baked bricks, presumably relating to production, are discovered. Its preserved remains have length of 3.2m and width 1.1m in North-South direction, turning to West in South, extends for additional 2.4m. Structure suffered in this case predominantly from damage, its Western side is completely destroyed and its original shape disappeared. Total height of remains is about 50cm. The lower part of a structure is laid with three rows of baked bricks and its width of 1.1m is in shape of pavement.

Thickness of the Eastern wall of a structure is 37cm, and it is laid with of full and half-size bricks. Cavity, resembling to a channel, with width of 21cm and depth of 36cm in front of was apparently for hot air mass flow. Four brick laid hearths with length of 46-50cm, keeping passes and hollows with width of 17cm are observed in the distance. The erection stretches to West. Just two hearths are registered in this area. Coal and ash layer were in channel-like hollows and passes (Fig.1). Baked bricks with dimensions of 21.5x21.5x5cm and 22x22x5cm were used in the masonry of structure.

PHARMACY EQUIPMENT

During archaeological studies of the complex, equipment, specific for pharmacy and/or an alchemical laboratory such, as various pottery, glassware samples, stone tools and plant remains were discovered. A pharmacy wasn't the only place, where medicines were sold, it also served, as a workshop, where medicinal plants were stored, processed, and medicines were prepared, using various devices (Alekperli, 2008, p. 67). Specialists state, that medieval apothecaries used various vessels and distillation apparatuses (Tschanz, 2003, p. 13). Miniature paintings, depicted in medieval manuscripts (Fig. 3), confirm use of many vessels of various sizes and shapes in pharmacies (Contadini, 2012; Ettinghausen, 1962; Masic et al., 2017; Shaddoud, 2017). Ettars, who knew medicine and chemistry, were closely involved at preparation of medicines (Mikaylova, 2008, p. 17) during the early and classical Islamic periods, in Azerbaijan. They were well aware of properties and effect of medicinal plants, collected and dried those plants, observed rules of storage of medicinal plant raw materials and prepared medicines from them (Əsgər Əhməd, 2012, p. 307).

It is known, an attempt on human's health in Islam is condemned, but actions, ensuring people's health, are welcomed. The 32nd verse of Sura Al-Maida of the Holy Quran states: "If anyone saves life, it is, as if he saves the lives of all mankind". It seems, expectations of medical workmen and pharmacies from their activities, weren't limited to obtaining of financial income, but desire to be worthy of spiritual reward and Allah's consent was also

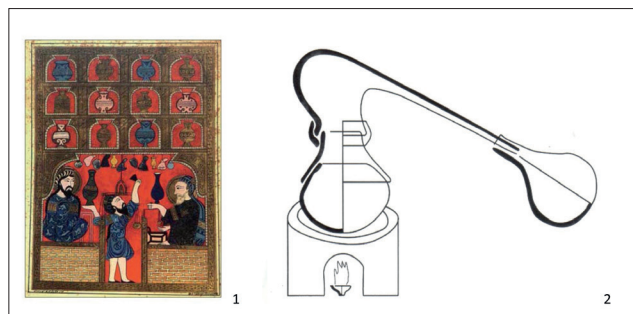


Fig. 3: Miniature drawings depicting the equipment used in the pharmacy / *Eczanede kullanılan ekipmanları gösteren minyatür resimler*

important (Maravia & Kaf al-Ghazal, 2021, p. 29). Hadith "there is no such disease, for which Allah wouldn't create a pharmacy" was famous in the Middle Ages and directed activities of pharmacists from ideological viewpoint (Masic et al., 2017, p. 364; Tschanz, 2016, p. 19). The first pharmacy in the Muslim Orient was established in the city of Baghdad in 754 or a little bit later and 60 pharmacies were in Baghdad proceeding two centuries, that is in the 70th of 10th century (Hamarnah, 1962, pp. 59-60).

Educated professional pharmacists, who understood moral and technical responsibility of their work, achieved great success in studying of effect of medicinal substances by preparing and applying new drugs against various diseases in the first half of the 9th century. During ruling of Caliph al-Mutasim, educated and responsible pharmacists were given licenses to run their pharmacies, whereas that was prohibited for non-educated drug sellers (Hamarnah, 1962, p. 60). We should take into account, that "Practitioners in Islam perceived that every ailment had something unique about it, consequently the prescribed diet or drugs also had to be individualized." (Igbal, 2010, p. 229).

Along with versatile information about drug properties, Al-Biruni's "Book of Pharmacy", who lived in the 11th century, also provided data on role of pharmacy and duties of a pharmacist. He identified 750 types of plants, 107 mineral means and 101 animal-based products (Sklyarova, 2015, p. 76). Activity of pharmacies and quality of prepared medicines was controlled by authorized representatives of the state, accountants and their assistants (Tschanz, 2003, p. 14). It is necessary to mention, that chemistry was not separated from pharmacy during Middle Ages. Muhammad ibn Zakariyya Razi, an outstanding scientist, who gained fame in the area of medicine, chemistry, mathematics, rhetoric and philosophy of this period, noted, that "Chemistry is to serve to medicine, and this science is to be connected with human health". His main function is neither to gain immortality, nor to acquire gold and silver. Chemistry serves only for medicine". He invented alcohol, which

PHARMACY REMAINS DISCOVERED IN TOWN OF SHAMKIR

was applied in medicine and prepared medicines, based on alcohol (Masic et al, 2017, p. 369; Tibi 2006). Alembic was in the equipment, used for extraction of alcohol in the Middle Ages.

Touching upon equipment, discovered during study of the archeological complex in Shamkir town, it is necessary to concentrate attention, first of all, on Alembic samples. One may state, that alembic pottery, preserved almost intact, was glazed from inside. It has hemispherical body, wide, short neck, truncated cylinder shape, round rim, tube, which extended laterally from the body and tapered towards the tip. Tip of a tube is broken (Fig. 4A). The term Alembic is derived from the Arabic word *al-anbig*, which means distillate. This term was used in Europe as Latin “*alambicum*” and later, as a short “*alembic*” form in English. Alembic was used in the process of essence extracting for distillation process. Alembics were widely used in chemical laboratories and pharmacies during Middle Ages in the Muslim Orient (Abdullaev, 1981, p.56; Amidzhanova, 1961, p. 248; Fomenko, 1993, pp. 55-60; Lamm, 1935; Papakhristu & Akhrrarov, 1981, p. 90; Shaddoud, 2017, fig. 5; Valiulina, 2005, pp. 44-47). They were made of clay or glass. Glass alembics were more widely spread. 14 undamaged and multiple fragments of glass alembics were discovered in the pharmacy (Mirzaakhmedov, 2011, pp. 105-106) during archaeological excavations in the town of Paykend, in Central Asia.

Use of alembic type laboratory or pharmacy vessels have been known since the 8th century in Azerbaijan. Along with other laboratory vessels, early alembic pottery is known from the Salbir area of Gabala town area and belong to the 8th century (Aliyev & Gadirov, 1985, p. 76). Archaeological evidence create basis for assumption, that the simplest technology of distillation process, essence extracting was applied in Mesopotamia, in the III millennium BC (Valiullina, 2005, p. 44).

Multiple sphero-conical vessels were discovered during archaeological study of remains of the pharmacy in Shamkir town (Fig. 5, A-B). It should be noted, that the upper part of sphero-conical samples is mostly spherical and the lower part is conical. The upper part completes with wheel-shaped and/or dome-shaped heading with very narrow opening. Sphero-conical vessels are made of fine, refractory clay and baked at high temperature. Its walls are thick, strong and waterproof. As a rule, the lower part is thicker and heavier. This category of pots is mainly characterized with thick walls, highly dense and extremely hard pottery (Nuretdinova, 2011, p. 51; Salakhov et al., 2006, p. 25). Discovery of sphero-conical vessels remains of the pharmacy during archaeological study wasn't accidental, application of those vessels in

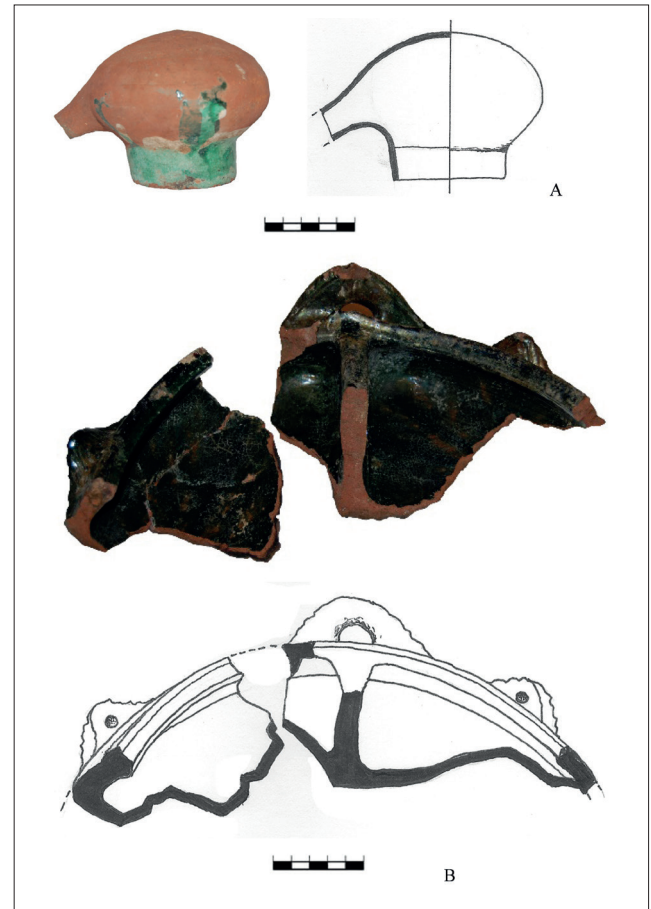


Fig. 4: Pottery used in pharmacy / *Eczanede kullanılan çömlekler*

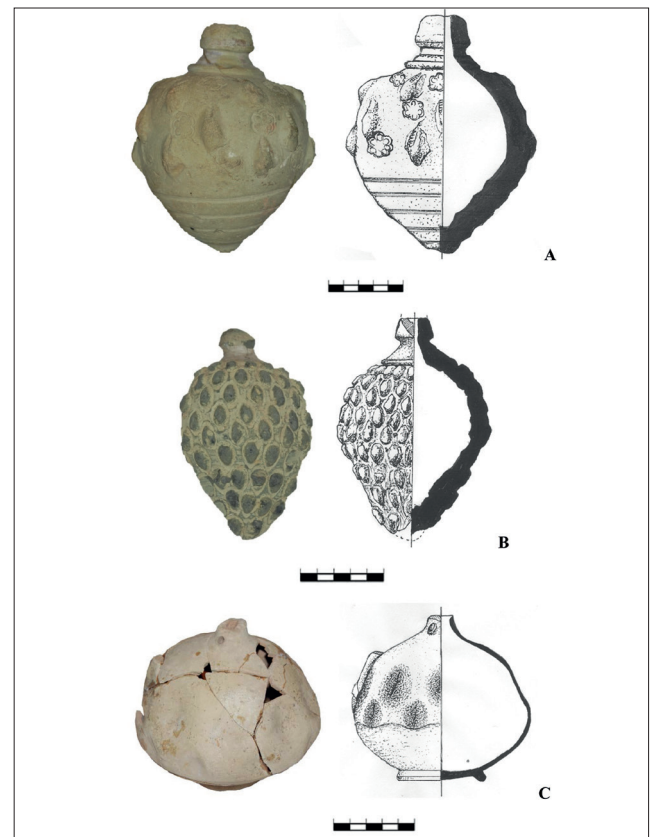


Fig. 5: Pottery used in pharmacy / *Eczanede kullanılan çömlekler*



Fig. 6: Albarello type vessel / *Albarelo tipi kaplar*

the process of preparation of medicines is documented.

Similar state was observed during archaeological excavations of medieval Bilyar town. The researcher S.I. Valiulina states, that interaction of alembic and sphero-conical vessels is confirmed on base of archaeological materials. According to her, sphero-conical vessels were applied at packaging and transportation of mercury and other substances and also at distillation process in pharmacies and chemical laboratories. With aim to substantiate her thesis, the researcher draws attention to description of the way of cinnabar purchase, referring to the work “Bayan as-sanaet” created by the author Khubaysh Tifisi in the 12th century (Valiulina, 2005, p. 160). It is necessary to mention, that archeometric study of fragments (26 pieces) of sphero-conical vessel, relating to mid of 14th - early 15th centuries of the Bulgarian town confirmed, that they were utilized by chemists. It was established, that most of samples was contain amount of mercury and arsenic the middle and inner layer of pottery, and in some copies, the amount of silver is high. Authors came to conclusion that these vessels were used in alchemical experiments (Khranchenkova et al, 2018, p. 240). Majority of ceramic samples, discovered in the religious complex close to minaret in the Aktobe town, contained fragments of sphero-conical vessels (240 pieces), which focused attention of researchers, concluding that scented liquid was used during ritual cleansing (Akynbek, 2013, p. 101, 103) and stored in those sphero-conical vessels. Interaction of alembic and sphero-conical vessels is confirmed by medieval illustrative sources.



Fig. 7: Albarello type vessel / *Albarelo tipi kap*

Numerous unglazed and glazed pottery pots and pans were detected during archaeological excavations of the pharmacy remains in Shamkir town. Shards of dark green glaze pot with division of internal body by partition wall into two parts and distinguishing with its structural characteristics, are of particular interest (Fig. 4B). It is apparent, that pot was used at activities with fire involvement. Application of glazed earthenware or glass vessels in alchemical laboratories and pharmacies during Middle Ages was predominant at operations with fire involvement. “Small Al-Kimiya Kulliyat” states that “Pots intended for operations with application of water and/or oil, with or without flame, should be made of glass, or should be glazed with from internal side”. In contrary case, many calamities may occur. Thus, if sour water is placed in a copper vessel, its walls will turn green, and in an iron or lead vessel, the walls will darken, spoil and spill. If sour water is poured into copper pot, then its walls will get green, iron or lead will get dark, its walls get spoil and break. If sour water will be poured earthenware, it will absorb in porous walls of jug, and whole initiative (intention) will be vain (Albertus, 1958).

During the archaeological research of the complex, fragments of albarello-type vessels, used for packaging and protecting medicines or raw materials, used for its preparation, were discovered. Those pots are glazed with turquoise and chestnut glaze (Fig. 6-7). The Albarello term is the Italian name for a pharmacy container used in Europe - Spain, Italy, France since the XV century. That term was brought to Italy from Spain, and it is of Arabic origin (Volkov, 2004, p. 297). Albarello-type vessels have been known in the Muslim Orient since the early Islamic period and refers to vessels, widely used in pharmacies (Bulatov, 1976, p. 89; Kurochkina, 2012, p. 92; Shaddoud, 2017, p. 201).

The distinguishing feature of small capacity, unglazed earthenware pot with ring-shaped basis, pear-shaped body, adorned with indents, narrow neck and single handle is a small hole in the lower part of a neck (Fig. 5C).

PHARMACY REMAINS DISCOVERED IN TOWN OF SHAMKIR

Earthenware pots with a small hole in the neck purposed for ventilation were used in pharmacie (Shaddoud, 2017, p. 198, fig. 7, 2) in the Muslim Orient. Many samples of faience and glazed earthenware and bowls among remains of the pharmacy were discovered.

Discovery of a large number of fragments of glass pots (Fig. 8-9), as a result of pharmaceutical activity during archaeological excavations wasn't accidental and it was connected with level of pharmacy development at that time.

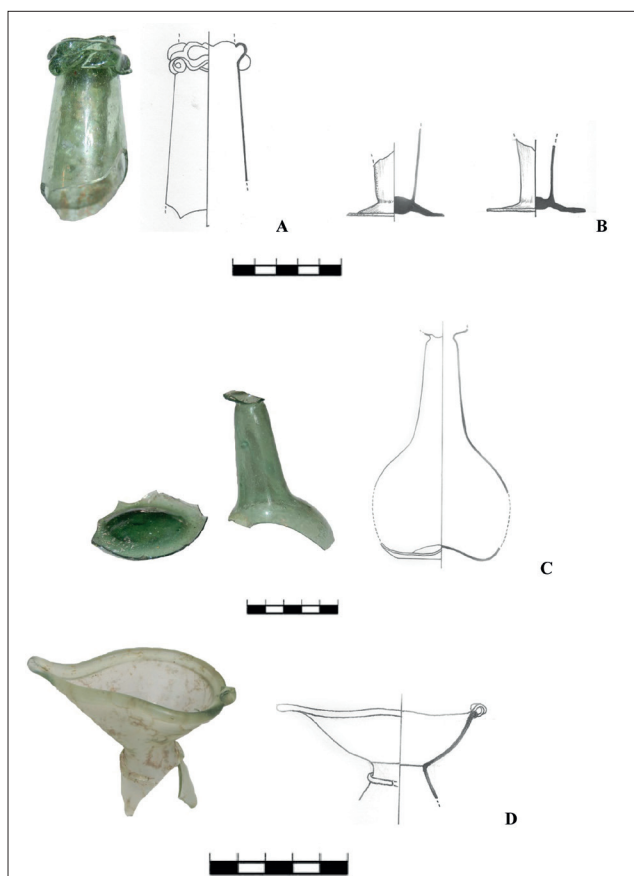


Fig. 8: Glass equipment of pharmacy / *Eczane cam ekipmanlari*

Widespread use of glass pots in alchemical laboratories and pharmaceuticals is reflected in medieval sources. Muhammad ibn Zakariyya Razi states in the al-chemistry part of the "Book of Secrets" that "For chemical operations with non-metallic substances it is better to make appliances from glass, so that those devices are not rubbed and crumbled and don't mix with substances. Such mixing is very harmful, however glass devices are not dangerous and are considered, as relevant (for this) (Amidzhanova, 1961, p. 248).

Glass pots are fragmentary and no fully intact copies have been left. However, fragments allow us stating of its

typological wealth and suitability for use in apothecary-laboratory. It is possible to mention containers, flasks and medicine vessels among such pots. By fragments it is possible to state flasks had spherical body, narrow neck and rim, opening outwards in a funnel shape.

Discovery in the complex of a stone grater, grindstone, remains of metal scales (lug), small iron and bronze balance weights is not accidental, it is connected with

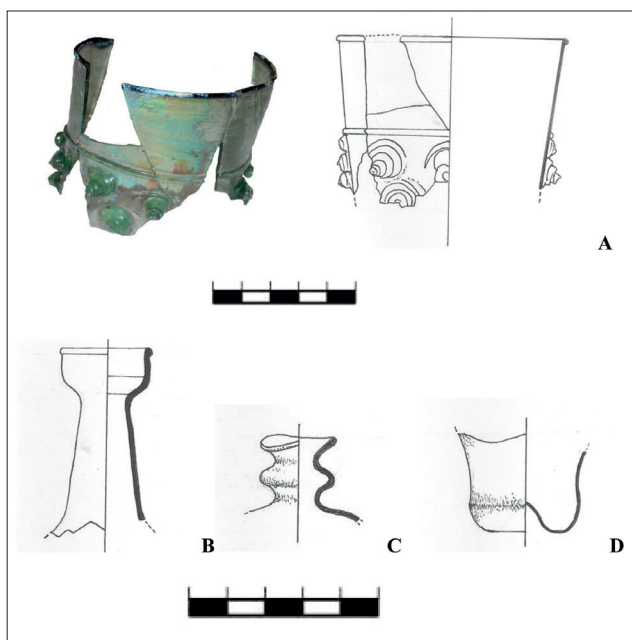


Fig. 9: Glass equipment of pharmacy / *Eczane cam ekipmanlari*

production process. Thus, namely mentioned artifacts were applied at processing of raw materials, and at preparation of medicines, for application of different types of raw materials with established weight.

PLANT REMAINS

It is known, that doctors of the Islamic world paid special attention to treatment by means of herbal medicines (Gülbin Özçelikay, 2010, p. 157). Charred vegetal remains assumed to be pharmacy remains were discovered in the area during archeological excavations, and these remains were studied and defined by leading research assistant of the Radiation Problems Institute of the Azerbaijan NAS, Ph.D Biology Nizami Rzayev. Botanical findings belong to *Triticum sphaerococum*, durum wheat, barley, as of wild, so of cultivated types, earth smoke -*Fumaria officinalis* L, apple seed and wild almond. The latter is called in traditional medicine, as almond. Its stalk is on them. Naturally, plant remains discovered, as a result of archaeological excavation of the complex comprise insignificant part from plant raw materials applied preparation of medicines in the pharmacy and due to

its charred condition, it is preserved in the soil. Most of plant remains were destroyed, because like other organic materials, they tend to rot. It is necessary to mention, that more than 1/3 of flora, typical to Azerbaijan nature, consists of medicinal plants (Gurbanov, 2009, p. 20).

By medieval sources types of plant remains found in the pharmacy during archeological excavation are of healing properties. For example, the Azerbaijani doctor Yusif ibn Ismayil Khoyi, an author of encyclopedic work on pharmaceuticals in Arabic language in the beginning of the 14th century, noted, that “If apples are regularly eaten, it rejuvenates body, strengthens heart, stomach, liver and improves appetite.” Daily consumption of apples is beneficial for elderly people with apnea and hurried breathing. Apple normalizes brain and strengthens its activity” (Alekperli, 2008, p. 76). Almonds are rich in minerals, fats, proteins and vitamins. Almonds were used, as a diuretic for good food digestion and almond oil was used, as a sedative and pain reliever for some diseases during Middle Ages in Oriental medicine. Almonds are also good for apnea, chest and lung swelling. Perfumes and various ointments were made from almond oil (Hakimova, 2015, p. 162).

Fumaria officinalis L is one of the medicinal plants among plant remains discovered during the archeological excavation. Yusif ibn Ismayil Khoyi touched upon its essential features in his work., *Fumaria officinalis* L is used as an appetite suppressant, heart strengthener, blood purifier, blood pressure regulator and blood-enhancing agent and it was also used at liver inflammation diseases in traditional medicine (Rzayev, 2013, p. 40; Safarova, 2021, p. 19).

Application of medicinal plants, as raw materials at preparation of various drugs is reflected in “Kitabi-Dade Gorgud” (Book of Dede Gorgud) saga, which includes the worldview, culture, and behavioral norms of Turkish child from the cradle up to grave. A scene of an ointment preparation from a mountain flower and hero’s wound treatment with it in the saga “Dirsa Khan oglu Bugaj Khan Boy” confirms prevalence of medicinal plants at preparation of medicine in the early Middle Ages: “... forty delicate girls spread out and gathered a mountain flower... Mountain flower with milk was applied on the boy’s wound... The boy’s wound healed after forty days, he became fit and healthy. The boy rode a horse and girded his sword. He hunted and shot birds” (Kitabi-Dədə Qorqud, 1988, p. 137).

The second of the five books of Ibn Sina’s work “Al Qanun fit Tibb” (“Law of Medicine”) is devoted to medicinal raw materials, medicine means and description of its preparation and administration (Ibn Sina, 1956). 1400

from 2600 drugs described in that work are of herbal origin. According to his formula, “A doctor has three tools: a word, a plant, a knife”. It is known that a special botanical garden was established in the place called “Fathabad” with aim to supply and cultivate medicinal plants for “Dar ush-Shafa” medicine in the “Rab’i-Rashidi” quarter of Tabriz. Medicines for patients, based on doctors’ prescriptions (Mikayilova, 2008, p. 16) were prepared in the pharmacy, which was located there.

Comprehensive study of 30 sources on medicine and pharmacology from the 10th-18th centuries preserved in the Institute of Manuscripts of the NAS of Azerbaijan allowed to identify 724 types of medicinal plants. It became known, that 422 species of medicinal plants were collected from the territory of Azerbaijan, and more than 300 species were brought from other countries (Alekperli, 2008, pp. 93-94).

CONCLUSION

Location of researched complex in Naringala, which is an important topographical part of the town and being close to a palace-type building belonging to the Seljuk period, indicates on significance of the complex. Signs of the complex, nature of discovered archaeological materials and possessing of medicinal properties by plant remains, fortifies supposition indicating that those remains are remains of pharmacy. Stratigraphic observation and analysis of archeological materials, particularly, samples of glazed and stonepaste wares provide grounds for definition that the complex was active in the beginning of the 12th-13th centuries. Study of the complex allows for the first time to comment on the medieval pharmacy of Azerbaijan based on archaeological evidence.

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